Amendments to the Claims

1. (Currently Amended) A radio transmitter module configured to generate a modulated signal having a three-level signal constellation from a data stream comprising a plurality of symbols, each symbol having one of three symbol values, the transmitter, comprising:

a first pulser configured for generating a high signal for each of the plurality of symbols having a first symbol value and a low signal for each of the plurality of symbols having a second symbol value or a third symbol value ~~to receive a data stream comprising high and low signal values, and to generate a waveform comprising relatively narrow pulses corresponding to the high signal values~~;

a second pulser configured for generating a high signal for each of the plurality of symbols having the third symbol value and a low signal for each of the plurality of symbols having the second symbol value or the first symbol value, the second pulser further comprising an inverted output ~~to receive a data stream comprising high and low signal values, and to generate a waveform comprising relatively narrow pulses corresponding to the high signal values~~; and

a combiner ~~couple with~~ coupled to the first pulser and the second pulser for combining pulsed signal outputs to generate the modulated signal ~~pulsers, the combiner configure to combine the waveforms generated by the first and second pulsers in order to generated a combined waveform; and a filter configured to filter the waveform generated by the pulser and to shape the waveform so that it is suitable for transmission~~.

2. (Currently Amended) The radio transmitter module of claim 1, wherein the ~~high signal values in the data stream associated with the first pulser represent a logic~~ three symbol values comprise "1", "0", and "-1".

3. (Currently Amended) The radio transmitter module of claim 1, further comprising a pulse-shaping filter for filtering the pulsed signal outputs ~~wherein the high signal values in the data stream associated with the second pulser represent a logic " 1"~~.

4. (Currently Amended) The radio transmitter module of claim 1, wherein the combiner

is configured to combine the pulsed signal outputs ~~two waveform~~ by subtracting signals ~~the waveform~~ generated by the ~~first~~ second pulser from signals ~~the waveform~~ generated by the first ~~second~~ pulser.

5. (Currently Amended) The radio transmitter module of claim 1, wherein the modulated signal produced by the first pulser, the second pulser, and the combiner comprises an in-phase signal, the radio transmitter further comprising:

a third pulser configured for generating a high signal for each of a plurality of input symbols having the first symbol value and a low signal for each of the plurality of input symbols having the second symbol value or the third symbol value ~~to receive a data stream comprising high and low signal values, and to generate a waveform comprising relatively narrow pulses corresponding to the high signal values~~;

a fourth pulser configured for generating a high signal for each of the plurality of input symbols having the third symbol value and a low signal for each of the plurality of input symbols having the second symbol value or the first symbol value, the second pulser further comprising an inverted output ~~to receive a data stream comprising high and low signal values, and to generate a waveform comprising relatively narrow pulses corresponding to the high signal values~~;

~~the~~ a ~~second~~ combiner ~~couple~~ coupled to ~~with~~ the third pulser and the fourth pulser ~~pulsers~~, the ~~second~~ combiner ~~configure~~ configured to combine pulsed outputs ~~the waveforms~~ generated by the third pulser and the fourth pulser ~~pulsers~~ for producing a quadrature-phase signal ~~in order to generated a combined waveform; and~~

~~a second filter configured to filter the waveform generated by the pulser and to shape the waveform so that it is suitable for transmission~~.

6. (Currently Amended) The radio transmitter module of claim 5, wherein the ~~high signal values in the data stream associated with the first pulser represent a logic~~ three symbol values comprise "1", "0", and "-1".

7. (Currently Amended) The radio transmitter module of claim 5, further comprising a pulse-shaping filter configured for filtering at least one of a set of signals, the set

comprising the pulsed outputs, the in-phase signal, and the quadrature-phase signal ~~wherein the high signal values in the data stream associated with the second pulser represent a logic "1"~~.

8. (Currently Amended) The radio transmitter module of claim 1, wherein the combiner is configured to combine the pulsed signal outputs ~~two waveform~~ by subtracting signals ~~the waveform~~ generated by the ~~third~~ fourth pulser from signals ~~the waveform~~ generated by the fourth ~~third~~ pulser.

9. (Currently Amended) The radio transmitter module of claim 5, further comprising an adder ~~coupled with the first and second filters, the adder~~ configured to combine the in-phase signal with the quadrature-phase signal ~~add the shaped waveforms generated by the first and second filters~~.

10. (Currently Amended) The radio transmitter module of claim 5, further configured for encoding the in-phase signal onto a first waveform and encoding the quadrature-phase signal onto a second waveform, the first waveform being orthogonal to the second waveform ~~wherein the waveform generated by the first filter is orthogonal to the waveform generated by the second filter~~.

11. (Currently Amended) The radio transmitter module of claim 1, wherein each of the first pulser and the second pulser comprises ~~pulsers each comprise~~ an AND gate and a delay module ~~configured to and the corresponding received data stream with a delayed version of the received data stream~~.

12. (Original) The radio transmitter module of claim 11, wherein the output of the AND gate associated with the second pulser is inverted.

13. (Currently Amended) The radio transmitter module of claim 5, wherein each of the third pulser and the fourth pulser comprises ~~pulsers each comprise~~ an AND gate and a delay module ~~configured to and the corresponding received data stream with a delayed~~

~~version of the received data stream~~.

14. (Original) The radio transmitter module of claim 13, wherein the output of the AND gate associated with the fourth pulser is inverted.

15. (Currently Amended) The radio transmitter module of claim 1, wherein each of the first pulser and the second pulser comprises ~~pulsers each comprise~~ an edge detector.

16. (Currently Amended) The radio transmitter module of claim 5, wherein each of the third pulser and the fourth pulser comprises ~~pulsers each comprise~~ an edge detector.

17. (Currently Amended) The radio transmitter module of claim 5, wherein the ~~first and second combiners are~~ combiner comprises at least one passive combiner ~~combiners~~.

18. (Currently Amended) The radio transmitter module of claim 5, wherein the ~~third and fourth combiners are~~ combiner comprises at least one active combiner ~~combiners~~.

19. (Currently Amended) A transmitter configured for receiving a data stream from~~,~~ ~~comprising:~~ a baseband circuit and generating a modulated signal having a three-level signal constellation ~~configured to generate a plurality of data streams; and a radio transmit module coupled with the baseband circuit~~, the transmitter ~~radio transmit module~~ comprising:

a first pulser configured for generating a high signal for each of the plurality of symbols having a first symbol value and a low signal for each of the plurality of symbols having a second symbol value or a third symbol value ~~to receive a data stream comprising high and low signal values, and to generate a waveform comprising relatively narrow pulses corresponding to the high signal values~~;

a second pulser configured for generating a high signal for each of the plurality of symbols having the third symbol value and a low signal for each of the plurality of symbols having the second symbol value or the first symbol value ~~to receive a data~~

~~stream comprising high and low signal values, and to generate a waveform comprising relatively narrow pulses corresponding to the high signal values~~; and

a first combiner ~~couple with~~ coupled to the first pulser and the second pulser for subtracting a pulsed signal output of the second pulser from a pulsed signal output of the first pulser to generate the modulated signal ~~the combiner configure to combine the waveforms generated by the first and second pulsers in order to generated a combined waveform; and~~

~~a filter configured to filter the waveform generated by the pulser and to shape the waveform so that it is suitable for transmission~~.

20. (Currently Amended) The transmitter of claim 19, wherein the ~~high signal values in the data stream associated with the first pulser represent a logic~~ three symbol values comprise "1", "0", and "-1".

21. (Currently Amended) The transmitter of claim 19, further comprising a pulse-shaping filter for filtering the pulsed signal outputs ~~wherein the high signal values in the data stream associated with the second pulser represent a logic "-1"~~.

22. (Currently Amended) The transmitter of claim 19, wherein the second pulser further comprises an inverted output for generating an inverted pulsed output, the first combiner ~~is~~ configured to ~~combine~~ sum the pulsed signal output ~~two waveform by subtracting the waveform~~ generated by the first pulser ~~from the~~ with the inverted pulsed output ~~waveform~~ generated by the second pulser.

23. (Currently Amended) The transmitter of claim 19 wherein the modulated signal produced by the first pulser, the second pulser, and the first combiner comprises an in-phase signal, the radio transmitter ~~wherein the radio transmitter module~~ further comprising ~~comprises~~:

a third pulser configured for generating a high signal for each of a plurality of input symbols having the first symbol value and a low signal for each of the plurality of input symbols having the second symbol value or the third symbol value ~~to receive a data~~

~~stream comprising high and low signal values, and to generate a waveform comprising relatively narrow pulses corresponding to the high signal values~~;

a fourth pulser configured for generating a high signal for each of the plurality of input symbols having the third symbol value and a low signal for each of the plurality of input symbols having the second symbol value or the first symbol value ~~to receive a data stream comprising high and low signal values, and to generate a waveform comprising relatively narrow pulses corresponding to the high signal values~~; and

a second combiner ~~couple~~ coupled to ~~with~~ the third pulser and the fourth pulser ~~pulsers~~, the second combiner ~~configure~~ configured to ~~combine~~ subtract a pulsed output ~~the waveforms~~ generated by the ~~third~~ fourth pulser from a pulsed output generated by the ~~and fourth~~ third pulser ~~pulsers~~ for producing a quadrature-phase signal ~~in order to generated a combined waveform; and~~

~~a second filter configured to filter the waveform generated by the pulser and to shape the waveform so that it is suitable for transmission.~~

24. (Currently Amended) The transmitter of claim 23, wherein the ~~high signal values in the data stream associated with the first pulser represent a logic~~ three symbol values comprise "1", "0", and "-1".

25. (Currently Amended) The transmitter module of claim 23, further comprising a pulse-shaping filter configured for filtering at least one of a set of signals, the set comprising the pulsed outputs, the in-phase signal, and the quadrature-phase signal ~~wherein the high signal values in the data stream associated with the second pulser represent a logic "1"~~.

26. (Currently Amended) The transmitter of claim 23, wherein the fourth pulser further comprises an inverted output for generating an inverted pulsed output, the second combiner ~~is~~ configured to sum ~~combine~~ the pulsed output ~~two waveform by subtracting the waveform~~ generated by the third pulser ~~from the waveform~~ with the inverted pulsed output generated by the fourth pulser.

27. (Currently Amended) The ~~r~~ transmitter of claim 23, ~~wherein the radio transmitter~~

~~module~~ further comprises an adder ~~coupled with the first and second filters, the adder~~ configured to combine the in-phase signal with the quadrature-phase signal ~~add the shaped waveforms generated by the first and second filters~~.

28. (Currently Amended) The transmitter of claim 23, further configured for encoding the in-phase signal onto a first waveform and encoding the quadrature-phase signal onto a second waveform, the first waveform being orthogonal to the second waveform ~~wherein the waveform generated by the first filter is orthogonal to the waveform generated by the second filter~~.

29. (Currently Amended) The transmitter of claim 19, wherein each of the first pulser and the second pulser comprises ~~pulsers each comprise~~ an AND gate and a delay module ~~configured to and the corresponding received data stream with a delayed version of the received data stream~~.

30. (Original) The transmitter of claim 29, wherein the output of the AND gate associated with the second pulser is inverted.

31. (Currently Amended) The transmitter of claim 23, wherein each of the third pulser and the fourth pulser comprises ~~pulsers each comprise~~ an AND gate and a delay module ~~configured to and the corresponding received data stream with a delayed version of the received data stream~~.

32. (Original) The transmitter of claim 23, wherein the output of the AND gate associated with the fourth pulser is inverted.

33. (Currently Amended) The transmitter of claim 19, wherein each of the first pulser and the second pulser comprises ~~pulsers each comprise~~ an edge detector.

34. (Currently Amended) The transmitter of claim 23, wherein each of the third pulser and the fourth pulser comprises ~~pulsers each comprise~~ an edge detector.

35. (Currently Amended) The transmitter of claim 23, wherein the first combiner and the second combiner comprise ~~combiners are~~ passive combiners.

36. (Currently Amended) The transmitter of claim 23, wherein the third combiner and the fourth combiner comprise ~~combiners are~~ active combiners.

37. (Currently Amended) A method of transmitting data in a wireless communication network, comprising:

~~generating a plurality of data streams~~;

~~generating waveforms comprising narrow pulses corresponding to each of the plurality of data streams~~;

generating a high signal for each of the plurality of symbols having a first symbol value and a low signal for each of the plurality of symbols having a second symbol value or a third symbol value for producing a first pulsed signal output;

generating a high signal for each of the plurality of symbols having the third symbol value and a low signal for each of the plurality of symbols having the second symbol value or the first symbol value for producing a second pulsed signal output; and

combining the first pulsed signal output with an inverted version of the second pulsed signal output ~~certain of the waveforms~~ to generate ~~a plurality of~~ at least one combined waveform having a three-level signal constellation ~~waveforms; and~~

~~pulse shaping each of the plurality of combined waveforms~~.

38. (Currently Amended) The method of claim 37, further comprising pulse shaping the at least one combined waveform ~~adding the pulsed shaped waveforms to generate a single waveform and transmitting the single waveform~~.

39. (Currently Amended) The method of claim 37, wherein generating the high signal for each of the plurality of symbols having the first symbol value and the low signal for each of the plurality of symbols having the second symbol value or the third symbol value for producing the first pulsed signal output; and generating the high signal for each of the

plurality of symbols having the third symbol value and the low signal for each of the plurality of symbols having the second symbol value or the first symbol value for producing the second pulsed signal output ~~a waveform comprising narrow pulses for each to the plurality of data streams~~ comprises ANDing each of ~~the~~ a plurality of data streams with a delayed version of itself ~~the data stream~~.

40. (Currently Amended) The method of claim 37, wherein generating the high signal for each of the plurality of symbols having the first symbol value and the low signal for each of the plurality of symbols having the second symbol value or the third symbol value for producing the first pulsed signal output; and generating the high signal for each of the plurality of symbols having the third symbol value and the low signal for each of the plurality of symbols having the second symbol value or the first symbol value for producing the second pulsed signal output ~~a waveform comprising narrow pulses for each to the plurality of data streams~~ comprises ~~using a~~ performing edge detection ~~detector to generate the waveforms~~.